

## Portable Cooler/Warmers

**B**elow is a selection of Koolatron® portable electronic refrigerators manufactured by Koolatron Division of Urus Industrial Corporation, Brantford, Ontario and Batavia, New York. They are "NASA-inspired" devices, according to company literature, based on the technology of thermoelectric temperature control refined for space applications.

Thermoelectric technology has been around in theory for 170 years and in actual use for decades, for defense and aerospace applications and in certain specialized air conditioning/refrigeration applications, such as submarines and infrared detectors. A thermoelectric cooler module consists of a number of semiconductor couples, connected in series and sandwiched between two ceramic plates. When connected to a DC power source, current causes heat to move from one side of the module to the other. In the cooler, the cold side is exposed to the contents of the cooler, and the hot side to a heat sink that dissipates heat to the environment. If the current is reversed, the heat is moved in the opposite direction and the cooler becomes an effective food warmer.

Early in the U.S. space program, NASA recognized a need for some form of space cooling system that would not require the bulky coils and compressors and motors of conventional refrigerators. This requirement sparked

research toward adapting thermoelectric technology to very small, lightweight, compact coolers. NASA's contribution to thermoelectrics was development of miniaturized thermoelectric components and packaging them in small units for use in the tight confines of spacecraft.

The NASA technology is the key to Koolatron's cooler/warmers, each of which employs one or two miniaturized thermoelectric modules. Each module is only about the size of a book of matches, but it delivers the cooling power of a 10-pound block of ice. In the cooling mode, the module reduces the outside temperature by 45 degrees Fahrenheit; in some models, a flick of a switch converts the cooler to a warmer with a capability of 125 degrees. Other than the small fan for blowing the heat away, Koolatron products have no moving parts to wear out or break down.

Koolatron manufactures portable Koolatrons in five models of varying capacity from nine to 48 12-ounce cans; they are plugged into the cigarette lighters of autos, recreational vehicles, boats or motel outlets. The company also offers a built-in model for home use.

\* Koolatron is a registered trademark of Urus International Corporation.

